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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/764,935	01/26/2004	Michael R. St. John	7773	9633

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EXAMINER	
CORDRAY, DENNIS R	

ART UNIT	PAPER NUMBER
1791	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/764,935	ST. JOHN ET AL.	
	Examiner	Art Unit	
	DENNIS CORDRAY	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 December 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13,15-18 and 20-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _____ is/are rejected.

7)☐ Claim(s) *1-13,15-18 and 20-23* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/12/2008 has been entered.

2. No claims have been amended. Two Declarations have been submitted.

Oath/Declaration

3. The Declarations of Laura C. Copeland , hereinafter referred to as Declaration A, and of Michael St. John, hereinafter referred to as Declaration B, under 37 C.F.R. 1.132, filed 12/12/2008, are acknowledged.

4. While the Declarations are not convincing in overcoming the outstanding rejections over the cited prior art, the rejections have been reformulated to better present the position of the Examiner. In addition, upon further consideration, new ground(s) of rejection are made as detailed below.

Declaration A presents evidence of increasing sales of two press dewatering aids sold since 2004 under the tradenames Metrix® and Velox® (p 1, pars 3 and 4; p 2, pars 5-9). A statement that the products have been well received by the paper industry and have resulted in additional business taken from the competition is included. Also included is a statement that no additional or extraordinary marketing efforts beyond what is similar to other promotions was undertaken. It is also stated that a thorough chemical analysis of these products is presented in a second Declaration of Michael St. John, also filed 12/12/2008.

Declaration B is presented to distinguish between the claimed invention and currently sold under the tradenames Metrix® and Velox® and those disclosed by Coscia et al. The Declaration states that the inventive polymers (as opposed to those of Coasia et al) include (i) a significantly higher amount of unreacted glyoxal; (ii) a significantly higher amount of di-reacted amino or amido groups; and (iii) a minimum level of di-reacted amino or amido groups (p 2, pars 5 and 6). Declaration B also presents distributions of unreacted, mono-reacted and di-reacted acrylamide, total reacted amide and unreacted glyoxal as a function of the glyoxal added/acrylamide mole ratio (pp 2-3, par 8, Table 1). The Declaration states that chemical additives that improve press dewatering were unknown at the time of the invention of Coscia et al. In addition, the polymers of Coscia et al are used as temporary wet strength additives in tissue and towel grades of paper, which do not have press dewatering sections pp 3-4, pars 10 and 11). The Declaration further provides experimental data showing that some polymers of Coscia et al do not provide improved drainage and that a reacted

glyoxal/acrylamide mole ratio greater than 0.12 provides no further increase in wet strength, but that the inventive polymers do improve the press dewatering (pp 4-7, pars 12-16, Figs 1-3).

The Declarations discuss polymers comprising acrylamide monomers partially reacted with glyoxal, but do not indicate which other monomers (amines, amides, cationic monomers, anionic monomers, amphoteric monomers, zwitterionic monomers) are included in the polymers or the relative amounts of any monomers. Glyoxal is the only aldehydic species named. The molecular weights of the polymers are unknown. The composition of the comparative polymers from Coscia et al is also unknown . Overall, the Declarations discuss and compare results of polymers of unknown composition drawn from the claimed polymers with polymers of unknown composition drawn from a prior art disclosure.

The detailed composition of the Metrix® and Velox® products is not present. The limited number of comparisons is not commensurate with the scope of the claimed invention, which embodies copolymers comprising a broad percentage of any amino or amido group, a broad percentage of almost any other monomer, a broad range of reacted aldehyde to amino or amido groups and any aldehydic monomer capable of adding aldehyde functionality. The broadly claimed polymers are added in a broadly claimed amount to a paper sheet. The Declarations thus cannot provide convincing evidence of commercial success commensurate with the scope of the broadly claimed invention.

Regarding the use of the polymers of Coscia et al for drainage and retention and in processes having press dewatering, Coscia et al discloses the polymers for temporary wet strength for tissue, paper toweling as one advantage. Additionally, the loss of the wet strength when soaked in water for a moderate length of time is advantageous for repulping broke without using acids, boiling or steam and without damaging the fibers, an advantage useful for any paper. Another advantage is that the polymers impart wet and dry strength to paper, which is useful in any paper (col 1, line 50 to col 2, line 6). Another advantage is development of wet strength at low temperatures (col 2, lines 14-23 and 33-49; col 13, line 65 to col 15, line 9, Examples 15-18). The disclosed polymers are not limited to use only in tissues and towel paper.

Regarding the use of glyoxylated acrylamide polymers in drainage and retention, Spence et al (6077394) disclose using the polymers overlapping those of Coscia et al with an aminopolyamide-epichlorihydrin resin as retention and drainage additives in alkaline fine paper, which involves a press dewatering section (col 1, lines 31-57; col 3, lines 15-50).

As discussed previous Office Actions, Coscia et al discloses generally that the ratio of reacted glyoxal to amide on the polymer backbone should be at least 0.6. Coscia et al also teaches an optimum ratio of 0.12 based on data gathered using a polymer of 97.8 mol-% acrylamide and 2.2 mol-% diallyldimethylammonium chloride (DADMAC). Coscia et al further teaches that a ratio of 0.10 - 0.20 appears to be an optimum range, but that the optimum ratio can be readily found through routine experimentation for a particular instance. A starting point of about one mole of glyoxal

for every four moles of vinylamide (resulting in a reacted ratio of about 0.12) is suggested (col 6, lines 59-73; col 12, line 44 to col 13, line 7, Example 12). There is no limitation to a maximum ratio of 0.20.

Regarding the significantly higher amount of unreacted glyoxal (Declaration B), the Declaration also states (p 2, par 8) that about 50 % of the glyoxal of Coscia et al is unreacted while, in the current invention, the amount of unreacted glyoxal ranges from 28 mol-% to 74 mol-%. The amount of unreacted glyoxal in Coscia et al is in the middle of the above range. The amount of unreacted glyoxal is not claimed.

Regarding the amount of di-reacted glyoxal, the argued features not claimed.

Response to Arguments

5. Applicant's arguments have been fully considered but they are not persuasive. The arguments pertain to the subject matter presented in the Declarations, which has been addressed above.

Claim Rejections - 35 USC § 102 and 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 1-4, 6-8, 13, 15-18, 20 and 21 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as being unpatentable over Coscia et al (3556932) as evidenced by Auhorn et al (6083348).

Coscia et al discloses adding aldehyde-functionalized vinylamide polymers either to preformed paper or to the fibrous suspension in a papermaking process in an amount from 0.2 to 2% of the dry weight of the fibers, or from 4 to 40 lb/ton (Abstract; col 7, lines 23-31 and 38-44). The polymers contain at least 50 mole percent, preferably greater than 75 mole percent, and up to 99 mole percent vinylamide (nonionic) units, which are exemplified by acrylamide (col 3, lines 42-60; col 8, lines 9-10 and 73-75, Example 1). The remainder of the monomer units in the polymer can be ionic monomers or nonionic "spacers" (such as vinyl acetate) (col 3, lines 46-49 and 58-60). Ionic monomers include cationic monomers (e.g.- DADMAC, exemplified in col 3, lines 42-60; col 8, lines 9-10 and 73-75, Example 1), and anionic monomers (e.g.-acrylic acid, col 5, lines 69-72; col 10, lines 45-46, Example 6).

The vinylamide units are partially reacted with glyoxal (glyoxylated) such that a ratio of reacted vinylamide to non-reacted units of at least 0.06:1 is obtained. The ratio may be higher (col 6, lines 59-67). In an example, ratios of 0.25:1 and 0.50:1 are used (col 12, lines 45-65; Example 12).

The molecular weight of the starting non-reacted polymer can be from 100,000 to 1,000,000 (col 3, lines 64-66) and the glyoxylation reaction adds to the molecular weight. Thus, in some embodiments, the glyoxylated polymer has a molecular weight in the claimed range. The polymeric composition significantly overlaps the claimed compositions.

Coscia et al does not disclose that the polymers enhance press section dewatering. However, polymeric additives in papermaking can serve multiple

simultaneous purposes, such as fixing agents, drainage and retention aids, flocculants and wet or dry strength aids (see Auhorn et al, 6083348, col 2, lines 34-37 if evidence is needed), thus the disclosed polymers can perform more than one function in the process. In some embodiments, the disclosed polymers are substantially identical to the claimed polymers, thus will enhance the press section dewatering because, where the claimed and prior art apparatus or product are identical or substantially identical in structure or composition, a *prima facie* case of either anticipation or obviousness has been established. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). In other words, when the structure recited in the reference is substantially identical to that of the claims, the claimed properties or functions are presumed to be inherent.

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Coscia et al in view of Sanchez (6315866).

Coscia et al is used as above. Coscia et al does not disclose a polymer comprising all nonionic monomers. Coscia et al does teach that the polymers increase the dry strength of paper as well as wet strength (col 2, lines 5 and 6).

Sanchez discloses that polyacrylamides (100% nonionic), copolymers of polyacrylamide and DADMAC and glyoxylated polyacrylamide-DADMAC copolymers increase dry strength of paper products (col 1, lines 49-51 and 61-63; col 8, lines 32-58). Sanchez also teaches that acrylamide-DADMAC copolymers provide several other advantages in papermaking processes, such as improved drainage and retention

(dewatering aid), improved sheet formation, increased brightness (Abstract; col 2, line 63 to col 3, line 4 and lines 29-30).

The art of Coscia et al, Sanchez and the instant invention is analogous as pertaining to adding glyoxylated polymers to paper in papermaking processes. It would have been obvious to one of ordinary skill in the art to use a glyoxylated polymer having no added ionic monomers in the process of Coscia et al in view of Sanchez as a functionally equivalent option with a reasonable expectation of success in achieving dry and wet strength and the other disclosed advantages.

8. Claims 9, 10, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Coscia et al as evidenced by Fallon (5571380).

Coscia et al does not disclose both cationic and anionic units in the same polymer. Coscia et al also does not explicitly disclose application amounts lower than 0.2 wt-% or application by spraying.

Claims 9 and 10: Aldehyde functionalized polymers comprising cationic units and aldehyde functionalized polymers comprising anionic units are separately disclosed in examples of Coscia et al for the same purpose. Since anionic and cationic monomers are both useful in the polymers, absent convincing evidence of unobvious results, it would have been obvious to one of ordinary skill in the art to have both cationic and anionic units in the same polymers and to have a reasonable expectation of success.

Alternatively, it is known in the art that acrylamide-containing polymers may contain a minor amount of acrylic acid or acrylic acid salt mer units due to inadvertent

hydrolysis of some acrylamide mer units, even though the polymer is not subjected to conditions that would hydrolyze a substantial proportion of the acrylamide. Up to about 5 mole percent anionic mer units in the polymer is exemplified (see Fallon, col 5, lines 41-56 if evidence is needed). One of ordinary skill in the art would have expected an amount of up to 5% of the acrylamide units in the polymer of Coscia et al to be inadvertently hydrolyzed, thus forming a polymer having cationic and anionic charges.

Claim 22: While Coscia et al discloses that substantial wet strength is imparted by using as little as 0.2 wt-% of polymer, the reference also teaches that less than 0.2 wt-% also imparts a significant amount of wet strength. It would thus have been obvious to one of ordinary skill in the art to use the claimed amount of polymer and to have a reasonable expectation of success in achieving a significant amount of wet strength.

Claim 23: Coscia et al does not disclose spraying the polymer onto the sheet but does disclose addition of the polymers to pre-formed paper. Although not explicitly disclosed, spraying is a well known method of applying an aqueous solution to a paper and would have been obvious to one of ordinary skill in the art as a functionally equivalent option. Spraying before press dewatering would also have been obvious to minimize the necessity of an additional dewatering step and to aid in the distribution of the polymer into the paper.

9. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Coscia et al in view of Carrier et al (5654198).

Coscia et al does not disclose a polymer containing zwitterionic monomers.

Carrier et al discloses that monomers used in preparing polymers useful in aqueous systems for problems associated with particulates, emulsification and flocculation (i.e.-dewatering) can be anionic, cationic and zwitterionic (col 3, lines 14-49). Carrier et al discloses copolymers comprising acrylamides and the anionic, cationic or zwitterionic monomers (col 3, lines 50-54; col 3, line 66 to col 4, line 11). Pendant aldehyde functionality is added by covalently attaching an aldehyde containing monomer to the acrylamide (col 3, line 67 to 4, line 2; col 4, lines 42-46).

The art of Coscia et al, Carrier et al and the instant invention are analogous as pertaining to the use of glyoxylated acrylamide polymers in papermaking. Absent evidence of unexpected results due to using zwitterionic monomers, it would have been obvious to one skilled in the art at the time of the invention to use a glyoxylated acrylamide polymer containing the claimed amount of zwitterionic monomers in the process of Coscia et al in view of Carrier et al as a functionally equivalent option with a reasonable expectation of success.

10. Claims 1-4, 6-10, 13, 15-18 and 20-22 are rejected under 35 U.S.C.103(a) as unpatentable over Spence et al (6077394) in view of Underwood et al (5674362) and further in view of Coscia et al and as evidenced by Auhorn..

Spence et al teaches that the formation of paper from a pulp slurry involves the drainage of process water on a wire and dewatering by pressing wet webs between felts. Drainage aids are added to increase the rate of dewatering. A retention aid is

also added as common practice (Abs; col 1, lines 31-43). Spence et al discloses adding to a filler-containing alkaline fine paper slurry resins known to provide wet and/or dry strength to unfilled paper, more specifically, an aminopolyamide epichlorohydrin (APAE) resin and a glyoxylated acrylamide-DADMAC resin (GPA). The resins increase the retention of filler in the paper and the drainage of process water from the slurry and increase the paper machine speed (col 1, lines 44-55; col 2, lines 11-24).

The GPA resins are by reacting glyoxal with a polyacrylamide-DADMAC polymer according to the method taught by Coscia et al with glyoxal with a mole ratio of glyoxal to acrylamide between about 2:1 and about 0.5:1 (reacted glyoxal:acrylamide about 0.25:1 to about 1:1) (col 3, lines 15-19 and 44-51). The polyacrylamide-DADMAC polymer comprises from about 75% to about 95% acrylamide and from about 5% to about 25% DADMAC. Up to 10% of the acrylamide can be replaced with other monomers (e.g.-acrylic acid), thus forming amphoteric polymers (col 3, lines 30-39).

The resins are added to the pulp as a mixture having a GPA:APAE ratio from about 3:1 to about 1:3 and in an amount from about 1 to about 10 lb/ton of dry pulp (col 4, lines 54-60; col 5, lines 10-14). The GPA polymers and addition amounts overlay the claimed polymers.

Spence et al does not disclose the claimed molecular weight.

Underwood et al discloses the same GPA:APAE resins as Spence et al but used as strength resins in papermaking (Abs; col 2, lines 11-16 and 36-48; col 3, line 38-58; col 4, lines 1-9). Underwood does not disclose the claimed molecular weight.

The disclosure of Coscia et al and evidence of Auhorn are as used as above.

The art of Spence et al, Underwood et al, Coscia et al and the instant invention is analogous as pertaining to adding glyoxylated polymers to paper in papermaking processes. GPA resins having molecular weights both below and overlaying the claimed values are disclosed as strength agents added during papermaking processes. Similar GPA resins having molecular weights below the claimed values are also disclosed as drainage and dewatering aids in papermaking processes having press dewatering sections. Polymeric additives in papermaking can serve multiple simultaneous purposes, such as fixing agents, drainage and retention aids, flocculants and wet or dry strength aids (see Auhorn et al if evidence is needed). It would have been obvious to one of ordinary skill in the art to use a glyoxylated polymer having the claimed molecular weight in the process of Spence et al in view of Underwood et al and further in view of Coscia et al as a functionally equivalent additive and to have a reasonable expectation of success in improving the dewatering of the paper.

11. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spence et al in view of Underwood et al and further in view of Coscia et al and even further in view of Carrier et al (5654198).

Spence et al, Underwood et al and Coscia et al are used as above. Spence et al, Underwood et al and Coscia et al do not disclose a polymer containing zwitterionic monomers.

Carrier et al is used as above.

The art of Spence et al, Underwood et al, Coscia et al, Carrier et al and the instant invention is analogous as pertaining to the use of glyoxylated acrylamide polymers in papermaking. Absent evidence of unexpected results due to using zwitterionic monomers, it would have been obvious to one skilled in the art at the time of the invention to use a glyoxylated acrylamide polymer containing the claimed amount of zwitterionic monomers in the process of Spence et al in view of Underwood et al and further in view of Coscia et al and even further in view of Carrier et al as a functionally equivalent option.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DENNIS CORDRAY whose telephone number is (571)272-8244. The examiner can normally be reached on M - F, 7:30 -4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Steven P. Griffin/
Supervisory Patent Examiner, Art Unit 1791

/Dennis Cordray/
Examiner, Art Unit 1791